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HYBRIDIZATION OF IXODES TICKS

G. S. Pervomayskiy

/At the May 1950 meeting of the Department of Biological Sciences, Academy of Sciences USSR, Docent G. S. Pervomayskiy presented an account of an experimental investigation conducted by him during a number of years at the Military Medical Academy imeni S. M. Kirov (Chair of General Biology and Parasitology imeni Ye. N. Pavlovskiy). A brief digest of the above follows./

In the process of studying the changeability of external morphological characteristics of adult Ixodes ticks, the question of obtaining a modified progeny by crossing closely and remotely related species of this genus was broached The intention was to establish whether it is possible to cross certain definite species and to investigate the characteristics of the progeny, including the latter's capacity to propagate further. The results of the investigation confirmed, on examples from the field of zoology, Academician T. D. Lysenko's postulate that vegetative and sexual hybridization are essentially similar.

The question of interspecies crossing of Ixodides, in addition to its significance for the study of morphological modifications exhibited by intermediary forms, is also of importance for understanding the specificity of members of this family in transmitting infectious diseases.

No published information on the interspecies crossing of pasture ticks is in existence at present. The experiments announced in this instance were carried out with the use of ticks which inhabit geographically distant areas (for instance, ticks from the Crimea and from the Tadzhik SSR) or are disparate in morphological and ecological respects.

The possibility of interspecies crossing of ticks was confirmed on a great number of possible combinations. In this type of crossing, the relative proportion of sexes in the progeny deviates considerably from the normal. In one batch of hybrids, males predominated, although normally equal numbers of males and females result. Furthermore a batch consisting of 457 hybrids contained

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61 gynandromorphs. In the remaining three batches of the same hybrids, there were only 11 gynandromorphs among 624 individuals.

All hybrids resulting from the crossing of females of R. bursa with males of R. sanquineus were found to be females. When the hybrid females were crossed with R. sanquineus males, a considerable number of gynandromorphs resulted. For instance, in three batches consisting of 342 individuals there were 323 females and 27 aynandromorphs. Apparently gynandromorphs appear most frequently in the progeny resulting from the crossing of remotely related species.

Gynandromorphism in ticks, if it is regarded as a combination of characteristics inherited from both parents which is similar to a mosaic, resembles gynandromorphism in plants as exemplified by I. V. Michurin's hybrid fruit obtained by fertilizing a peach plant with almond pollen. The dual character of this fruit extended to the seed, which on planting was found to be fertile. Vegetative hybridization of plants also offers many examples of hybrids of the mosaic type which combine characteristics of two parent species that may be either closely or distantly related. The mosaic of species characteristics and sexual characteristics which arise in the hybridization of Ixodides varies with different crossing combinations. This variation is entirely similar to that resulting from vegetative hybridization.

One may conclude that gynandromorphs and vegetative hybrids of the mosaic type have a common basis of development, because both are hybridization products obtained by merging initial organisms which are only distantly related, and because a mosaic combination of characteristics results in either case.

/In the discussion which followed, Prof I. Ye. Glushchenko remarked that the information dealing with mixed heredity produced by vegetative hybridization is of particular interest. Academician Ye. N. Pavlovskiy emphasized that as a result of breeding a great number of ticks, gynandromorphs which hitherto had been encountered and described only in rare cases were obtained in considerable numbers, and furthermore may be obtained experimentally in any desired quantity. He then added that this result indicates that one may to a certain extent steer heredity into the desired channels, and concluded by pointing out the great economic significance of the work on Ixodes ticks./

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